Steam Generator Issues

NRC Meeting

September 11, 2002

Agenda

- Introductions
- NRC GLCP Comments
- Generic License Change Package (GLCP)
- Other SG Issues
- Future Actions

SG Program GLCP

GLCP Status

- SG GLCP is a simplification and a significant improvement when compared to current TS. For example:
  - SG performance criteria added
  - Informed inspection intervals included
  - Extensive reference to SG Program requirements that are:
    - Captured in industry guidelines that are prepared and maintained by industry experts
    - Required to be met in accordance with an industry initiative

GLCP Status

- It is time to submit the GLCP.
  - There remain differences between the industry and staff but they can be resolved as technical issues on a schedule that does not delay the GLCP implementation
    - June 10th letter changes adopted
    - September 9th memo changes, some added to TS, some remain to be resolved as technical issues.

Industry GLCP Schedule

- Industry plans to submit the GLCP through an NEI template and a lead plant submittal before the end of 2002. Processing these will start in the next few weeks.
- Industry intention with respect to including the various NRC comments from the Sept 9th memo in the GLCP submittal are indicated on the following slides
- Further TS comments should be addressed through the RAI process

NRC Comments Affecting the GLCP TS

Summarized NRC comments are shown in underlined red.

Background

- Revision 6 of the SG Examination Guidelines was approved on August 6, 2002
  - Rev. 6 will be issued by October 2002
  - Implementation will be required by September 1, 2003
- On August 13th NEI sent the NRC:
  - A final draft of Rev. 6 and
  - Industry responses to NRC NDE comments from the staff's 9/18/01 memo
- NEI received NRC comments on Rev. 6 and other NDE issues on September 9th. GLCP issues addressed today.
  - Comments separated into those that affect the TS and others that are related to the GLCP.

NRC GLCP Comments

- Structural integrity criterion -the abbreviated version in the admin TS does not explain how to treat thermal loads
  - Current industry strawman still under review:

> *Steam Generator Tubing shall retain Structural Integrity over the full range of normal operating conditions (including startup, operation in the power range, hot standby, and cooldown and all anticipated transients included in the design specification) and design basis accidents. This includes retaining a safety factor of 3.0 against Burst under Normal Steady State Full Power Operation and a safety factor of 1.4 against Burst* ***applied to the largest primary to secondary pressure gradient under Service Level D (faulted) accident conditions. Other service loadings required by the existing design and licensing basis shall be combined with the design basis accident loads without application of the 1.4 safety factor***

NRC GLCP Comments

- Include the definition of burst in the Admin TS.
- Industry will not include this definition in the proposed TS
  - Inconsistent with precedent
    - Other program requirements in the admin TS (e.g., containment leakage) depend on supporting documents for details including definitions
  - Burst definition is already an industry requirement
    - Industry and NRC have agreed on a definition of burst.
    - The definition is in the SG Tube Integrity bases and in the Integrity Assessment Guidelines which is one of the EPRI Guidelines required by NEI 97-06.
    - A formal industry initiative requires that SG Program meet NEI 97-06
  - Interpretation appears to be an open issue
    - NRC comments have raised new issues on this topic. It is not appropriate to include an open issue in TS.

NRC GLCP Comments

- Accident induced leakage criterion -the abbreviated version in the admin TS is not sufficient
- Industry TS proposal will use the current SG Program version:

> *The primary to secondary Accident Induced Leakage Rate for **any design basis accident**, other than a steam generator tube rupture, shall not exceed the Leakage rate assumed in the accident analysis in terms of total leakage rate for all steam generators and leakage rate for an individual steam generator. Leakage is not to exceed [1 gpm per steam generator, except for specific types of degradation at specific locations where the NRC has approved greater accident-induced leakage as part of a plant's licensing basis. Exceptions to the 1 gpm limit can be applied if approved by the NRC in conjunction with approved Alternate Repair Criteria].*

NRC GLCP Comments

- Operational leakage performance criterion needs to be included in the Admin TS
- Industry will reference Operational Leakage TS in the Admin TS
  - ITS avoids duplication of requirements
  - ROP is applicable to TS required shutdowns under 50.73 LERs

NRC GLCP Comments

- Use the description of Condition Monitoring that was used in previous versions of the GLCP
  - Industry will submit the previously approved version in the Admin TS:

> Condition Monitoring Assessment means an evaluation of the "as found" condition of the tubing with respect to the performance criteria for structural and accident leakage integrity. The "as found" condition refers to the condition of the tubing during a steam generator inspection outage, as determined from the inservice inspection results or by other means, prior to the plugging or repair of tubes. Condition monitoring assessments shall be conducted during each outage during which the steam generator tubes are inspected, plugged, or repaired to confirm that the performance criteria are being met. Requirements for condition monitoring are defined in the Steam Generator Program.

NRC GLCP Comments

- Tube repair criteria must be in the TS
- Industry agrees to include the tube repair criteria in the admin TS as proposed by the staff in their Sept. 9th memo except for the underlined changes below:

Tube Repair Criteria: Tubes found by inservice inspection to contain flaws with a depth equal to or exceeding *[40%]* of the nominal tube wall thickness shall be plugged **or repaired** prior to **entry into Mode 4.**

*[The following tube repair criteria may be applied as an alternative to the 40% depth-based **criteria**:*

Alternate tube repair criteria currently permitted by plant technical specifications are to be listed here. The description of these alternate tube repair criteria should be equivalent to the descriptions in current technical specifications.]

NRC GLCP Comments

- The definition of tube repair criteria should be included in the TS
- Industry will not include this definition in the proposed TS
  - Inconsistent with precedent
    - Other program requirements in the admin TS (e.g., containment leakage) depend on supporting documents for details including definitions
    - Staff's proposed definition is not in agreement with the version approved during the GLCP development – "Repair Criteria are those NDE measured parameters at or beyond which a tube must be repaired using an approved Repair Method or removed from service by plugging."
  - Repair criteria definition is already an industry requirement
    - Industry and NRC agreed on a definition during preparation of the GLCP.
    - The definition is contained in the SG Integrity TS Bases and will be included in Rev. 2 of NEI 97-06.
    - A formal industry initiative requires that SG Program meet NEI 97-06
  - Definition appears to be an open issue
    - NRC comments are in disagreement with established definition.

NRC GLCP Comments

- Repair methods should still be listed in the TS.
- Industry will not include repair methods in proposed TS
  - No regulatory or code requirement for including tube sleeves or any other repair method in TS
    - SG replacements are performed under 10CFR50.59, why not repairs?
    - ITS removed similar maintenance related requirements from TS
  - Sleeving repairs are governed by 10CFR50.59, ASME Code, and Industry Guidelines
    - The industry is committed to the ASME Code and the NRC endorses it via 10CFR50.55a
  - Risk significant issues should be addressed as part of the Code endorsement

NRC GLCP Comments

- The definition of tube repair methods should be included in the TS
- Industry will not include this definition in the proposed TS
  - Inconsistent with precedent
    - Other program requirements in the admin TS (e.g., containment leakage) depend on supporting documents for details including definitions
    - Staff's proposed definition is not in agreement with the version approved during the GLCP development – "Repair Methods are those means used to reestablish the RCS pressure boundary integrity of SG tubes without removing the tube from service. Plugging a steam generator tube is not a repair."
  - Repair methods definition is already an industry requirement
    - Industry and NRC agreed on a definition during preparation of the GLCP.
    - The definition is contained in the SG Integrity TS Bases and will be included in Rev. 2 of NEI 97-06.
    - A formal industry initiative requires that SG Program meet NEI 97-06
  - Definition appears to be an open issue
    - NRC comments are in disagreement with established definition.

NRC GLCP Comments

- The inspection intervals in the TS should include the maximum interval requirements and other limits
- Industry agrees to include only the maximum inspection intervals as a function of tubing material consistent with the EPRI G/L
  - June 10 NRC letter to NEI requested that maximum inspection intervals be included in the TS
    - Details requested in the Sept 9th staff comments are in the SG Program and are not appropriate for TS.
  - Current Tech Specs place requirements only on maximum intervals. Proposed TS are consistent.
  - Industry is already agreeing to substantial new requirements:
    - Typical existing TS requires that one SG be inspected every 40 calendar months (all SGs in 40 months times no. of SGs)
    - Proposed TS and EPRI G/L require inspecting each SG every
      - 24 EFPM (and each RFO) for 600 MA,
      - 48 EFPM for 600TT,
      - 72 EFPM for 690 TT
    - Minimum sample size at each inspection increased to 20% vs. existing TS - 3%

NRC GLCP Comments

- The inspection intervals in the TS should include dependence on fuel cycles
- Industry will not include requirement for limit on fuel cycles in the proposed TS
  - Existing TS do not specify inspection intervals in terms of fuel cycles
  - There is a strong relationship between time at temperature and degradation. Industry is not aware of any significant relationship between startups and shutdowns and tube degradation. Any small effects are accounted for by margins in the requirements.
  - The suggested change does not account for other startups and shutdowns within a fuel cycle.

NRC GLCP Comments

- Proposed inspection interval TS:

Steam generator tube inspection intervals shall be established based on the following:

[1. Each steam generator with Alloy 600 mill annealed tubing shall be inspected each refueling outage, not to exceed 24 EFPM.]

[2. No steam generator with Alloy 600 thermally treated tubing shall operate more than 48 effective full power months without being inspected.]

[3. No steam generator with Alloy 690 thermally treated tubing shall operate more than 72 effective full power months without being inspected.]

NRC GLCP Comments

- The term "degradation activity threshold" should be used in the TS instead of active degradation mechanism
- Not applicable to the GLCP. The term will not be used in the proposed TS.
- Will create an inconsistency with the Rev. 6 of the SG Exam Guidelines – will consider for Rev. 7.

NRC GLCP Comments

- Maximum SG inspection interval discussion in the admin TS must contain a definition of "degradation activity threshold".
  - Industry has accepted some of the NRC comments on active damage mechanism from the 9/18/01 memo and included the result in Rev. 6 as follows:

Active Damage Mechanism

A combination of ten or more, new indications (" 20% TW) of thinning, pitting, wear (excluding loose part wear) or impingement and previous indications which display an average growth rate equal to or greater than 25% of the repair limit in one inspection-to-inspection interval in any one SG,

One or more new or previously identified indications (" 20% TW) which display a growth greater than or equal to the repair limit in one inspection-to-inspection interval, or

Any crack indication (outside diameter IGA/SCC or primary side SCC).

NRC GLCP Comments

- Definition of "degradation activity threshold" (contd.)
- Industry will not include this definition in the proposed TS
  - Inconsistent with precedent
    - Other program requirements in the admin TS (e.g., containment leakage) depend on supporting documents for details including definitions
  - Active damage mechanism is already defined in industry requirements
    - The definition is contained in the SG Examination Guidelines which is one of the EPRI Guidelines required by NEI 97-06.
    - A formal industry initiative requires that SG Program meet NEI 97-06
  - Interpretation appears to be an open issue
    - NRC comments have raised new issues on this topic. It is not appropriate to include an open issue in TS.

NRC GLCP Comments

- Wear due to foreign objects must be considered active degradation until the objects are identified and removed
- Active degradation and loose parts evaluations are part of the SG Program requirements. They are details that are not appropriate for TS and they will not be included in the GLCP.
- Loose part wear evaluations are included in the operational assessment. The current requirements in the integrity guidelines will be revised to increase the emphasis on the need for evaluation for foreign object wear and its effects on inspection intervals

NRC Comments not Affecting the GLCP

NRC GLCP Comments

- Suggested Clarifications to Section 5.2, "Degradation Assessment"
  - Industry will include suggested clarifications in the Integrity Guidelines
    - Currently under revision
    - Expect publication early 2004
    - Interim guidance will be considered

NRC GLCP Comments

- Clarification to Assessment of Wear Flaws
- Industry recognizes a large leak-type flaw that does not violate performance criteria is a significant issue
- Industry will add guidance to the Integrity Assessment Guidelines and/or In Situ Pressure Test Guidelines that will require specific corrective actions including operational assessment for this type of flaw.
- Interim guidance will be considered.

SG Program GLCP Change Summary

SG Program GLCP

- Changed per NRC June 10 letter:
  - Added to the administrative tech specs:
    - Structural integrity and accident induced leakage performance criteria,
    - Tube repair criteria, and
    - Maximum inspection intervals

SG Program GLCP

- Alternate approach to NRC June 10th letter
  - Repair methods not listed in the admin tech specs – already controlled by Code
  - Operational leakage criterion already in the tech specs
- Differences between the Sept 9th memo and the GLCP TS will be addressed with the staff as technical issues

SG Program GLCP

- It is time to submit the GLCP and thereby fix the current TS
  - The proposed version captures the most significant NRC comments. Many of those that have not been included are controlled by SG or are program details not appropriate for TS
  - Industry intends to continue working on technical issues with the staff

Other SG Issues

Tubesheet Inspections

- Issue identified at Sequoyah regarding extent of rotating coil inspections within the tubesheet
- Industry position:
  - Appendix B, not TS Compliance
  - Backfit implications
- Status of generic communication?
- More effective way to handle – question how SG tube integrity is ensured vs emergency TS changes

TMI Plug Tube Sever Study

- No safety significant findings to date
- Schedule slip due to emerging industry issues
  - Completion by end of 2002
- Will meet with the staff when completed

Future Actions

- Distribute GLCP template for final industry review
- Submit GLCP to NRC for approval
- Submit lead plant license amendment
- Submit TSTF travelers
- Determine CLIIP applicability
- Resolve technical issues with staff
  - Next meeting?